GREIFSWALD.—The University has received a grant of 381,000 marks for a new library building, and 200,000 marks for the construction of a physical laboratory.

SCIENTIFIC SERIALS

Bulletin of the Nuttall Ornithological Club. A Quarterly Journal of Ornithology. Vol. III. January, No. 1.—This journal, on entering upon its third volume, has increased its quarterly numbers from a thin part of twenty-four pages to a part containing forty-eight pages and a coloured plate. It will continue, as before, under the editorial management of Mr. J. A. Allen, assisted by Prof. Baird and Dr. E. Coues, and it is intended that the volume for the current year should contain an exhaustive *résumé* of the current literature relating to North American Ornithology. The present number contains—Dr. E. Coues : On *Passerculus bairdi* (with plate), and *P. princeps.*—H. W. Henshaw on the species of Passerella.—W. A. Cooper : On the breeding of *Carpodacus purpureus*, var. *Californicus.*—W. Brewster : On the first plumage of North American birds.—J. A. Allen : On Wallace's theory of birds' nests.—N. S. Goss : Breeding of the duck hawk in trees.—Notes of recent literature and general notes.

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, vol. xi. fasc. iii.—On the action of so-called catalytic force viewed according to the thermodynamic theory, by M. Tommasi.—Study on the dominant diseases of vines, by M. Garovalio and Cattaneo.—On the chronology of Tyrrhenian volcanoes, and on the hydrography of the Val di Chiana previously to the miocene epoch, by M. Verri.—On the permanent magnetism of steel at different temperatures, by M. Poloni.—On the plasmogonic production of leptothrix and leptomitus, by M. Cattaneo.—On the refrigeration of pulverulent metallic solids (continued), by M. Cantoni.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, February 28.—"On the Reversal of the Lines of Metallic Vapours," by G. D. Liveing, M.A., Professor of Chemistry, and J. Dewar, M.A., F.R.S., Jacksonian Professor, University of Cambridge. No. I.

In order to examine the reversal of the spectra of metallic vapours, the authors observe the absorptive effect produced on the continuous spectrum emitted by the sides and end of the tube in which the volatilisation takes place. For this purpose they use iron tubes about half an inch in internal diameter, and about twenty-seven inches long, closed at one end, thoroughly cleaned inside, and coated on the outside with borax, or with a mixture of plumbago and fireclay. These tubes are inserted in a nearly vertical position in a furnace fed with Welsh coal, which will heat about ten inches of the tube to about a welding heat, and they observe through the upper open end of the tube, either with or without, a cover of glass or mica. To exclude oxygen, and avoid as much as possible variations of temperature, they introduce hydrogen in a gentle stream through a narrow tube into the upper part only of the iron tube, so that the hydrogen floats on the surface of the metallic vapour without producing convection currents in it. By varying the length of the small tube conveying the hydrogen, they are able to determine the height in the tube to which the metallic vapour reaches, and to prevent further displacement of the vapour, and thus to maintain different lengths of the iron tube full of metallic vapour at a comparatively constant temperature for considerable periods of time.

By this means the following observations have been made up to the present time :—

The first metal experimented on was thallium, one of the most volatile of metals. After arranging the current of hydrogen so as to keep the tube free from air, but without any rapid movement of the gas, they saw the characteristic line reversed, and maintained it so for a considerable time.

The metal indium, closely allied in its behaviour and volatility to thallium, was next examined, and they observed the bright blue line reversed. This was most plainly visible when that portion of the vapour which was nearest to the sides of the tube was looked through.

They had great difficulty in preventing the oxidation of magnesium in the tube, and in using tubes wider than half an inch, did not succeed in getting any reversal, but with half-inch tubes the *b* lines were clearly and sharply reversed, also some dark lines, not measured, seen in the blue. The sharpness of these lines depended on the regulation of the hydrogen current, by which the upper stratum of vapour was cooled.

A piece of metallic lithium was introduced, and gave no results. Sodium was next added in the same tube, and this did not bring out the reversal of the lithium lines. Similarly, chloride of lithium and metallic sodium, introduced together, gave no better results. To a tube containing potassium vapour, some lithium chloride was added, but no lithium line appeared. On adding metallic sodium to this atmosphere, and more lithium chloride, the bright-red lithium line appeared sharply reversed, and remained well defined for a long time. It is worthy of observation that the lithium line was only reversed in a mixture of the vapours of potassium and sodium, and it seems highly probable that a very slightly volatile vapour may be diffused in an atmosphere of a more volatile metal, so as to secure a sufficient depth of vapour to produce a sensible absorption. This would be analogous to well-known actions which take place in the attempt to separate organic bodies of very different boiling points by distillation, where a substance of high boiling-point is always carried over, in considerable quantity, with the vapour of a body boiling at a much lower temperature. It is a matter for future investigation how far chemical interactions taking place in a mixture of metallic vapours affect the volatility of a third body, and what relation, if any, this may have to such phenomena as the increased fusibility of mixtures of salts of potassium and sodium, and the well-known fluidity of the alloy of those metals.

As the authors have had occasion to use sodium and potassium in their tubes, they have had opportunities of observing the absorption spectra of these metals, and they find that there is a great deal yet to be observed in regard to these spectra. Up to the present time they have not observed any of the appearances noted by Lockyer, "On a New Class of Absorption Phenomena," in the *Proceedings* of the Royal Society, vol. xxii., but they have repeatedly noted the channelled-space spectrum of sodium described by Roscoe and Schuster, in the same volume of the *Proceedings*. They observed in their tubes no channelled space absorption by potassium, but continuous absorption in the red and one narrow absorption band, with a wave-length of 5,730, not corresponding with any bright line of that metal.

With reference to the absorption spectrum of sodium vapour they remark that it is by no means so simple as has been generally represented. The fact that the vapour of sodium in a flame shows only the reversal of the D lines, while the vapour, volatilised in tubes, shows a channelled space absorption, corresponding to no known emission spectrum, appears to be part of a gradational variation of the absorption spectrum, which may be induced with perfect regularity. Experiments with sodium, carried out in the way described, exhibit the following succession of appearances, as the amount of vapour is gradually diminished, commencing from the appearance when the tube is full of the vapour of sodium, part of it condensing in the cooler portion of the tube, and some being carried out by the slow current of hydrogen. During this stage, although the lower part of the tube is at a white heat, we have always noticed, as long as the cool current of hydrogen displaced metallic vapour, that, on looking down the tube, it appeared perfectly dark. The first appearance of luminosity is of a purple tint, and, with the spectroscope, appears as a faint blue band, commencing with a wave-length of about 4,500, and fading away into the violet. Next appears a narrow band in the green, with a maximum of light, with a wave-length of about 5,420, diminishing in brightness so rapidly on either side as to appear like a bright line. This green band gradually widens, and is then seen to be divided by a dark band, with a wave-length of about 5,510. Red light next appears, and between the red and green light is an enormous extension of the D absorption lines, while a still broader dark space intervenes between the green and the blue light. The dark line in the green (wave-length about 5,510) now becomes more sharply defined. This line appears to have been observed by Roscoe and Schuster, and regarded by them as coinciding with the double sodium line next in strength to the D lines, but it is considerably more refrangible than that double line. In the next stage, the channelled space spectrum comes out in the dark space between the green and blue, and, finally, in the red. Gradually the light extends, the channels disappear, the D lines absorption narrows, but still the dark line in the green is plainly discernible. Lastly, there is only D lines absorption. The blue and the streak of green light at first observed seem to the authors due to luminosity of the vapour itself, where it is somewhat cooled, the later stages being mixed phenomena of absorption and emission.

As the absorption line, with wave-length about 5,510, has not been distinctly recorded by other observers, they have endeavoured to trace it under somewhat different conditions from that of the vapour volatilised in white hot-iron tubes. This absorption-line is easily seen when a gas-flame is observed through a horizontal glass tube, about three inches long, containing sodium volatilised in the middle of the tube by the heat of a Bunsen's burner, and equally well whether the tube contains hydrogen or nitrogen, besides sodium. They have also observed the same absorption-line when a piece of commercial magnesium ribbon (which always contains sodium) is ignited in a horizontal position, so that the metal melts and produces an elongated flame. It is of some interest to note that absorption-lines of about this wave-length, in the solar spectrum, are given by Kirchhoff and Angström not corresponding with emission lines of known elementary bodies.

When potassium vapour is observed, whether in the iron tube or in a glass tube, an absorption-line is seen, with a wave-length of about 5,730, which is more refrangible than the yellow double emission line of potassium, and does not correspond to any known bright line of that metal.

They reserve, for a future communication, the discussion of the identity or non-identity of these absorption-lines with lines in the solar spectrum and the inferences which may be drawn from such determination.

The method of observation described may be used to observe emission-spectra as well as absorption-spectra, for if the closed end of the tube be placed against the bars of the furnace so as to be relatively cooler than the middle of the tube, the light emitted by the vapours in the hottest part is more intense than that emitted by the bottom of the tube. This succeeds admirably with sodium, but they have not specially observed it with other vapours.

Chemical Society, March 22.—Dr. Gladstone, president, in the chair.—The following papers were read:—On aromatic nitrosamines, by Dr. O. N. Witt. The author gives an account of his study of some complicated reactions of diphenylnitrosamine. He has found that ordinary ethylic nitrite contains nitric acic, and has therefore used mixtures of pure amylic nitrite and nitric acid for acting on diphenylamine, and has obtained mononitrodiphenylnitrosamine in light yellow plates melting at 133·5° C., and two bodies which, on the removal of their nitroso groups, yielded dinitrodiphenyamine and an isomeric substance. The final product of the action of strong nitric acid is hexanitrodiphenylamine.—The next paper was on a new process for the volumetric estimation of cyanides, by J. B. Hannay. The cyanide is dissolved in water, and the solution rendered alkaline by ammonia. A standard solution of mercuric chloride is run in with constant stirring until the liquid is distinctly opalescent. The end reaction is sharply marked and very delicate. The presence of silver does not interfere, so that the process can be used for estimating the cyanides present in a plating bath.—The last paper was on certain bismuth compounds, Part 7, by M. M. P. Muir. The author has compared the behaviour of bismuthous and phosphorous chlorides in certain reactions; the latter substance acts as a reducing agent in some cases in which the former does not exert any such action. The author has also studied two oxalates of bismuth, the production of the so-called bismuthates, and some experiments with bismuthous iodide.—Mr. Williams exhibited a fine sample 24 oz. of natural salicylic acid, also about one gallon of pure methylic alcohol.

Linnean Society, March 21.—W. Carruthers, F.R.S., vice-president, in the chair.—Mr. G. T. Saul exhibited an example of the enormous development of adventitious roots from a species of *Berberis*.—On behalf of Mr. J. Willis Clark of Cambridge, there was exhibited mounted specimens of the male, female, and young of the fur-bearing seal of the North Pacific. Mention was made of the "rookeries" of these creatures, containing over 3,000,000 seals in a compact area. Like old Turks, a male dominates over a harem of a dozen or fifteen females, which he guards with jealous care, for two months or more, never stirring from the spot, and meantime fights terrific battles for its maintenance. A neutral zone exists to the rear of the breeding-grounds, where the enforced bachelors and adolescent young of both sexes repair. These come and go continuously, passing to and fro through free lanes of passage. Others of these animals delight in dashing among the breakers on the surf, or in droves frolic and play on the sand and grassy dunes adjoining the more rocky ground of the "rookery." The method of shaving the fleshy side of the skin, thus cutting loose the roots of the long coarse hairs, and retaining the superficial fine fur of commerce was explained, as also other interesting points in the economy and natural history of the Otaries.—The Secretary read the gist of a paper on the venation of the leaf of hemlock (*Conium maculatum*), by Mr. J. Gorham. The latter's observations show that in a piece $\frac{1}{3}$ inch long, by $\frac{1}{6}$ inch wide, by registration of the veinlets in a tabular form, and constructing these in figure, an exact counterpart of the venation of the entire leaf results. Comparisons of leaves of different umbelliferous genera prove that each can be detected and recognised from the merest fragment.—A communication was made by Mr. B. Clarke on a new arrangement of the classes of zoology, founded on the position of the oviducts, or when these are absent on the position of the ovaries, including a new mode of arranging the mammalia.—A notice in abstract was given on some genera of the Olacaceæ, by Mr. J. Miers. He describes a new genus, Rhaptarrhena, from Brazil, allied to Aptandra; also three other genera, Myoschilos, Arjona, and Quinchamalium, which possess a distinct though small calyx and separate calycle.—The Rev. M. J. Berkeley and Mr. C. E. Broome gave a list of fungi from Brisbane, Queensland. Among these Agarics, Clavarei, and fleshy fungi are scarce; interesting forms of Polyporei obtain while leaf-parasites are poorly represented. Some species are identical with Ceylon and South American kinds, and several are common to Europe.—The following gentlemen were elected Fellows of the Society:—John Evans, F.R.S., C. P. Ogilvie, Arthur Veitch, and Sydney H. Vines, B.A.

Zoological Society, March 19.—Mr. Arthur Grote, vice-president, in the chair.—The Secretary exhibited the type specimen of *Dicrurus marginatus* of Blyth, and pointed out its identity with *Muscipipra vetula* (fam. Tyrannidæ).—Mr. J. W. Clark, F.Z.S., exhibited and made remarks on some stuffed specimens of the Sea Lion (*Otaria ursina*) of the Prybylov Islands, which had been presented to the Museum of the University of Cambridge by the Alaska Commercial Company.—A communication was read from the Marquis of Tweeddale, F.R.S., containing the sixth of his contributions to the ornithology of the Philippines. The present memoir gave an account of the collections made by Mr. A. H. Everett in the Island of Leyte.—Mr. P. L. Sclater, F.R.S., read a report on the collection of birds made during the voyage of H.M.S. *Challenger*, in the Sandwich Islands, and pointed out the characters of a new species of duck, of which it contained specimens, and which he proposed to call *Anas wyvilliana*.—A communication was read from Mr. W. A. Forbes, F.Z.S., containing notes on a small collection of birds from the Samoan Islands and the Island of Rotumah, Central Pacific.—A communication was read from Mr. F. Nicholson, F.Z.S., containing a list of the birds collected by Mr. E. C. Buxton, at Darra Salam, on the Coast of Zanzibar.—Messrs. F. Du Cane Godman and Osbert Salvin gave descriptions of new species of Central American butterflies of the family Erycinidæ.—Prof. A. H. Garrod, F.R.S., read some notes on the visceral anatomy of *Lycaon pictus* and *Nyctereutes procyonides*.—A communication was read from Mr. Andrew Anderson, F.Z.S., containing the description of a new Indian *Prinia*, obtained in the Bagesur Valley, North-Western Himalayahs, which he proposed to name *Prinia poliocephala*.

Meteorological Society, March 20.—Mr. C. Greaves, president, in the chair.—Mr. B. L. Smith was elected a Fellow.—The discussion on Dr. Tripe's paper on the winter climate of some English sea-side health resorts was resumed and concluded, after which the following papers were read:—Notes on a water-spout, by Capt. W. Watson, F.M.S.—Notes on the occurrence of globular lightning and of waterspouts in Co. Donegal, Ireland, by M. Fitzgerald.—Observations of rainfall at sea, by W. T. Black.—The discussion on the subject of waterspouts and globular lightning was adjourned till the next meeting, on April 17.

Anthropological Institute, March 26.—Mr. John Evans, D.C.L., F.R.S., president, in the chair.—The following new members were announced:—Dr. Sebastian Evans and Dr. Allen Thomson, F.R.S.—A paper was read by Mr. Francis A. Allen on the original range of the Papuan race. This paper was a brief *résumé* of the opinions held by many anthropologists with regard to the origin, characteristics, and distribution of these races, and an attempt to prove that they once extended on the west as far as Africa, and on the east as far as America. The writer especially dwelt upon the statements of Herodotus with regard to the eastern and western Ethiopians, and the black Colchians, and referred to the legend of the Asiatic Memnon, and the existence of black races in Central America, within the historic period. The director then read a paper by Dr. Julius von Haast, F.R.S., on some ancient rock paintings in New Zealand. The author considered that when these rock paintings were carefully studied by archæologists and linguists, they would prove that at one time there had been an introduction of a far higher civilisation than the Maories ever reached.

Institution of Civil Engineers, April 2.—Mr. Bateman, president, in the chair. The paper read was on the Huelva Pier of the Rio Tinto Railway, by Mr. T. Gibson, Assoc. Inst. C.E.

EDINBURGH

University Chemical Society, February 20.—John Gibson, Ph.D., F.R.S.E., presiding.—Mr. W. L. Goodwin read a paper on a method of removal of iron from cupric sulphate for analytical purposes, in which he stated that this could be performed by the replacement of the iron by cupric hydrate.—Mr. Alexander Macfarlane, M.A., B.Sc., read a paper on the disruptive discharge of electricity, in which he gave the difference of potential necessary to produce sparks at different distances up to ten millimetres, and also with different pressures and gases as dielectrics.

February 27.—W. Inglis Clarke, B.Sc., in the chair.—A paper on electrolysis was read by R. M. Morrison, D.Sc., Chemical Demonstrator of the University, in which he traced the history of electrolysis down to the present time, showing that as recently as 1840 the art was practically in its infancy, and that at the present day it was in numberless ways made use of. The chief points of theoretical and practical interest were dwelt upon, both with regard to the various metals which could practically be used, and to the solvents from which the best results were obtainable.

VIENNA

Imperial Academy of Sciences, January 10.—On the behaviour of propylic glycol in a high temperature, by M. Linnemann.—On the direct transformation of isobutylic iodide into trimethylcarbinolamin, by M. Brauner.—On artificial malic acid from evernic acid, by M. Loydl.—On the Maxwell-Simpson synthesis of aerolein from diiodacetone, by M. Voelker.—On the behaviour of β bibrompropionic acid towards iodide of potassium, by M. Zotta.—On the so-called rag-illness of workers in paper manufactories, by M. Frisch.

January 17.—The undulating nutation of internodes, by M. Wiesner.

January 31.—Determination of the path of the second comet of 1874, by M. Wenzel.—Contributions to a fuller knowledge of the Tunicata, by M. Heller.—On Ampère's fundamental electrodynamic experiments, by M. Ettinghausen.—On the behaviour of phoroglucin and some related substances towards woody cell membranes, by M. Wiesner.—On the degeneration of leaf-growth of some Amygdaleæ, produced by species of *Exoascus*.—On the theory of surface potential, by M. Wassmuth.—Contribution to study of electricity, magnetism, terrestrial currents, magnetic variation, declination, inclination, and intensity, by M. Daubrawa.—On a simple method of drawing a tangent to the ellipse and parabola, by M. Zimels.

PARIS

Academy of Sciences, April 8.—M. Fizeau in the chair.—The following among other papers were read:—Extract from a work by M. Chevreul, on the vision of colours. M. Chevreul describes some effects obtained by rotation, with diminishing speed, of a disc having one half red the other white, as compared with a similar disc viewed when at rest.—On the transparence of coloured flames, by M. Gouy. For measuring very weak radiations the objective of the collimator of a spectroscope is half covered with a plane mirror which reflects the rays from a second collimator parallel to the axis of the first. Thus in the focal plane of the telescope are got two superposed spectra, received on a slit parallel to the lines, which serves as eye-pieces. The two flames compared send their rays through the two collimators respectively; the eye sees through the prisms half of each of the objectives as a circle with its two halves of the same colour, but differing in brightness. The same brightness is given them by means of two Nicols on the second collimator. The angle of the principal sections is then read, and indicates the result of experiment. Coloured flames, got from a mixture of common gas and air with a finely-powdered salt in it, were carefully regulated and inclosed in another flame at the same temperature, but without metallic vapour. M. Gouy demonstrates the transparency of flame for the rays it does not emit, and for its own radiations.—On the variation of indices of refraction in mixtures of isomorphous salts, by M. Dufet. He finds that the differences between the indices of a mixture of two isomorphous salts and those of the component salts are in inverse ratio of the number of equivalents of the salts present in the mixture.—Direct fixation of oxygen and sulphur in benzine and toluene, by MM. Friedel and Crafts. Such fixation is accomplished by the intervention of chloride of aluminium; the authors cite it as supporting their hypothesis about this class of reactions.—Researches on nitrification by organic ferments, by MM. Schlœsing and Muntz. The vegetable organisms, mould and mycoderms, which are strongly productive of combustion of organic matter, do not produce nitrification; on the contrary, they transform nitric acid, placed at their disposal, first into organic matter then, partly, at least, into free nitrogen, the last phenomenon being often attended by production of ammonia. Hence they effect a loss of the combined nitrogen on the surface of the globe. The function of nitrifying combined nitrogen seems to be the special attribute of a group of particular beings, and not common to all the organisms which are intermediaries of combustion.—Absorption by the living organism of carbonic oxide introduced in small quantities into the atmosphere, by M. Gréhant. Man or an inferior animal caused to respire for half an hour in an atmosphere containing only $\frac{1}{779}$ of carbonic oxide, absorbs this gas sufficiently for about half of the red corpuscles combined with the gas to become incapable of absorbing oxygen, while in an atmosphere containing $\frac{1}{1449}$ of carbonic oxide, about a fourth of the red corpuscles are combined with this gas.—On the organ called chorda dorsalis in *Amphioxus lanceolatus*, by MM. Renaut and Duchamp. Amphioxus deprived of red blood containing hæmoglobin in its special elements, has no longer a chorda dorsalis comparable in its structure to that of all vertebrates.

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